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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,598	07/26/2001	Padmanabha I. Venkitakrishnan	10008009	8711

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER

KNOLL, CLIFFORD H

ART UNIT	PAPER NUMBER
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2112

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/916,598

Applicant(s)

VENKITAKRISHNAN ET AL.

Examin r

Clifford H Knoll

Art Unit

2112

-- The MAILING DATE of this communicati n appears on the cover sheet with the corresp ndence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, the "respective cache unit" is unclear because it is not clear to what it is "respective", nor is its relationship to previously recited cache units positively recited.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4, 7, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Arimilli (US 6587926).

Regarding claim 1, Arimilli discloses the processor units, cache units, embedded RAM (e.g., Figure 1), a cache coherent bus coupled to the processor units and the

Art Unit: 2112

embedded RAM unit, the bus configured to provide cache coherent snooping commands from the processor units to ensure cache coherency between the cache units for the processors and the embedded RAM unit (e.g., col. 2, lines 1-5).

Regarding claim 2, Arimilli also discloses an input output unit coupled to the bus to provide input and output transactions for the processor units (e.g., col. 5, lines 23-27).

Regarding claim 3, Arimilli also discloses the bus configured to provide split transactions for the processor units coupled to the bus (e.g., col. 5, lines 28-31).

Regarding claim 4, Arimilli also discloses the bus is configured to transfer an entire cache line for the cache units of the processor units (e.g., col. 7, lines 48-50).

Regarding claim 7, Arimilli also discloses support of a symmetric multiprocessing method for the plurality of processor units (e.g., col. 4, lines 49-55).

Regarding claim 9, Arimilli also discloses the processor units are configured to provide read data via the bus when the read data is stored within a respective cache unit (e.g., col. 7, lines 54-56).

Thus are claims 1-4, 7, and 9 rejected.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli in view of standard practice of implementing buses, as further evidenced by Arimilli (US 6571322, hereinafter Arimilli-2).

Regarding claim 5, Arimilli also discloses a system bus, but neglects to mention the particular detail of bus width; however the Examiner takes Official Notice that the 256-bit wide system bus is a standard feature of cache coherent architectures. This is further evidenced by Arimilli-2. Arimilli-2 discloses the bus is 256 bits wide (e.g., col. 9, lines 7-8). It would be obvious to combine a standard bus width with Arimilli because Arimilli discloses a particular cache coherency protocol that is useful with standard system buses. Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine Arimilli with the standard system bus width of 256 bits.

This is claim 5 rejected.

4. Claim 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli in view of Arimilli-2.

Regarding claim 5, Arimilli also discloses a system bus, but neglects to mention the particular detail of bus width; however this feature is disclosed by Arimilli-2. Arimilli-2 discloses the bus is 256 bits wide (e.g., col. 9, lines 7-8). A person of ordinary skill in the art would be motivated to combine Arimilli-2 with Arimilli because Arimilli-2 teaches the improvement of a cache coherent system, such as Arimilli, by accommodating the standard system bus width of 256 bits as a sector that does not need to be invalidated

Art Unit: 2112

(e.g., col. 5, lines 35-38). Therefore it would be obvious to one of ordinary skill in the art to combine Arimilli-2 with Arimilli at the time the invention was made to obtain the claimed invention.

Thus is claim 5 rejected.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli in view of standard practice of memory implementation, as further evidenced by Miller (6560682).

Regarding claim 6, Arimilli discloses an embedded RAM core, but fails to disclose the detail of using DRAM to implement memory; however the examiner takes Official Notice that the use of a DRAM core is standard embodiment of a RAM memory. This is further evidenced by Miller. Miller discloses the embedded DRAM core (e.g., col. 5, lines 7-10). It would be obvious to combine the DRAM implementation of memory with Arimilli because the embedded DRAM core is a standard means to implement a RAM unit. Therefore it would be obvious to one of ordinary skill in the art to combine a standard memory embodiment with the disclosure of Arimilli.

Thus is claim 6 rejected.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli in view of standard embodiment of a processor, as further evidenced by Bitar (US 6418460).

Art Unit: 2112

Regarding claim 8, Arimilli neglects to disclose implementational details of a particular processor core; however the Examiner takes Official Notice that MIPS architecture is a standard processor and is well-known for its implementation in symmetric multiprocessing systems, such as in the system of Arimilli. This is further evidenced by Bitar. Bitar discloses the multi-processor units are compatible with a version of a MIPS processor core (e.g., Figure 2B, col. 13, line 39; and col. 17, lines 13-14 in the context of multiprocessor systems). It would be obvious to combine Arimilli with the standard MIPS architecture, because the use of MIPS architecture is widely known in the implementation of symmetric multiprocessing systems such as the system of Arimilli. Therefore at the time the invention was made, it would be obvious to a person of ordinary skill in the art to combine the MIPS architecture, as evidenced by Bitar, with Arimilli to obtain the claimed invention.

Thus is claim 8 rejected.

7. Claims 10-13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli in view of the standard practice of integrating circuits, as further evidenced by Sherburne (2002/0184546).

Regarding claim 10, Arimilli discloses a power supply; a plurality of processor units; a plurality of cache units, one of the cache units provided for each one of the processor units; an embedded RAM unit for storing instructions and data for the processor units (e.g., Figure 1); a cache coherent bus coupled to the processor units and the embedded RAM unit, the bus configured to provide cache coherent snooping

Art Unit: 2112

commands from the processor units to ensure cache coherency between the cache units for the processor units and the embedded RAM unit (e.g., col. 2, lines 1-5). Arimilli does not expressly mention a particular embodiment of an integrated circuit die; however the Examiner takes Official Notice that it is manifestly obvious to integrate multi-processing devices for the well-known and well-noted advantages of portability, power consumption, and so forth. This is further evidenced by Sherburne. Sherburne discloses the well-known practice of using highly integrated devices to obtain the advantages of decreased size and weight (e.g., paragraph [0002]). It would be obvious to combine Arimilli with the well-known practice of integration because the practice is standard and the advantages for doing so are well established in areas such as those evidenced by Sherburne, which included multiprocessing systems with cache and embedded memory. Therefore it would be obvious to one of ordinary skill in the art to combine Arimilli with the standard practice of integration.

Regarding claim 11, Arimilli also discloses an input output unit coupled to the bus to provide input and output transactions for the processor units (e.g., col. 5, lines 23-27).

Regarding claim 12, Arimilli also discloses the bus configured to provide split transactions for the processor units coupled to the bus (e.g., col. 5, lines 28-31).

Regarding claim 13, Arimilli also discloses the bus is configured to transfer an entire cache line for the cache units of the processor units (e.g., col. 7, lines 48-50).

Regarding claim 16, Arimilli also discloses support of a symmetric multiprocessing method for the plurality of processor units (e.g., col. 4, lines 49-55).

Art Unit: 2112

Regarding claim 18, Arimilli also discloses the processor units are configured to provide read data via the bus when the read data is stored within a respective cache unit (e.g., col. 7, lines 54-56).

Thus are claims 10-13, 16, and 18 rejected.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli and the standard practice of integration, as applied in claim 10 above, further in view of Arimilli-2.

Regarding claim 14, Arimilli also discloses a system bus, but neglects to mention the particular detail of bus width; however this feature is disclosed by Arimilli-2. Arimilli-2 discloses the bus is 256 bits wide (e.g., col. 9, lines 7-8). A person of ordinary skill in the art would be motivated to combine Arimilli-2 with Arimilli because Arimilli-2 teaches the improvement of a cache coherent system, such as Arimilli, by accommodating the standard system bus width of 256 bits as a sector that does not need to be invalidated (e.g., col. 5, lines 35-38). Therefore it would be obvious to one of ordinary skill in the art to combine Arimilli-2 with Arimilli and the well-known practice of integration at the time the invention was made to obtain the claimed invention.

Thus is claim 14 rejected.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli and the standard practice of integration, as applied in claim 10 above, further in view of the standard practice of memory implementation, as further evidenced by Miller.

Regarding claim 15, Arimilli fails to disclose the detail of using DRAM to implement memory; however the examiner takes Official Notice that the use of a DRAM core is standard embodiment of a RAM memory. This is further evidenced by Miller. Miller discloses the embedded DRAM core (e.g., col. 5, lines 7-10). It would be obvious to combine standard implementation practice with Arimilli because the DRAM is a standard means to implement an embedded RAM core. Therefore it would be obvious to one of ordinary skill in the art to combine a standard memory embodiment with the disclosure of Arimilli and the well-known practice of integration.

Thus is claim 15 rejected.

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli and the standard practice of integration, as applied in claim 10 above, further in view of a standard processor embodiment, as evidenced by Miller.

Regarding claim 17, Arimilli neglects to disclose implementational details of a particular processor core; however the Examiner takes Official Notice that MIPS architecture is a standard processor for symmetric multiprocessing, such as in the system of Arimilli. This is further evidenced by Bitar. Bitar discloses the processor units are compatible with a version of a MIPS processor core (e.g., Figure 2B, col. 13, line 39; and col. 17, lines 13-14 in the context of multiprocessor systems). It would be obvious to combine Arimilli with the standard MIPS architecture, because the use of MIPS architecture is standard in the implementation of symmetric multiprocessing systems such as the system of Arimilli. Therefore at the time the invention was made, it would

Art Unit: 2112

be obvious to a person of ordinary skill in the art to combine the MIPS architecture, a standard embodiment as evidenced by Bitar, with Arimilli and the standard practice of integration to obtain the claimed invention.

Thus is claim 17 rejected.

11. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimilli, in view of standard practice of integration and memory implementation, as evidenced by Sherburne, and further in view of Arimilli-2.

Regarding claim 19, Arimilli discloses and a power supply, a plurality of processor units; a plurality of cache units, one of the cache units provided for each one of the processor units; an embedded RAM core unit for storing instructions and data for the processor units (e.g., Figure 1); a cache coherent bus coupled to the processor units and the embedded RAM core unit, the bus configured to provide cache coherent snooping commands from the processor units to ensure cache coherency between the cache units for the processor units and the embedded RAM core unit (e.g., col. 2, lines 1-5). Arimilli does not expressly mention a particular embodiment of an integrated circuit die and said invention occurring in a portable hand-held device; however the Examiner takes Official Notice that it is manifestly obvious to integrate multi-processing devices for the well-known and well-noted advantages of portability, power consumption, and so forth. Likewise, the Examiner also takes Official Notice that the use of DRAM as a memory implementation is standard practice. This also is further evidenced by Sherburne. Sherburne discloses the well-known practice of using highly

Art Unit: 2112

integrated devices rendering the advantages of decreased size and weight (e.g., paragraph [0002]) as well as the manifest advantages of portability in a use such as handheld device (e.g., paragraph [0002]) and also the use of DRAM to implement memory (e.g., Figure 1). It would be obvious to combine Arimilli with the well-known practice of integration because the practice is standard and the advantages for doing so are well established in areas such as those evidenced by Sherburne, which include multiprocessing systems with cache and embedded memory. Likewise the use of DRAM to implement memory as, evidenced by Sherburne, is standard practice. Therefore it would be obvious to one of ordinary skill in the art to combine Arimilli with the standard practice of integration.

Arimilli also discloses a system bus, but neglects to mention the particular detail of bus width; however this feature is disclosed by Arimilli-2. Arimilli-2 discloses the bus is 256 bits wide (e.g., col. 9, lines 7-8). A person of ordinary skill in the art would be motivated to combine Arimilli-2 with Arimilli because Arimilli-2 teaches the improvement of a cache coherent system, such as Arimilli, by accommodating the standard system bus width of 256 bits as a sector that does not necessarily need to be invalidated (e.g., col. 5, lines 35-38). Therefore it would be obvious to one of ordinary skill in the art to combine Arimilli-2 with Arimilli and the well-known practice of integration at the time the invention was made to obtain the claimed invention.

Regarding claim 20, Arimilli also discloses the bus configured to provide split transactions for the processor units coupled to the bus (e.g., col. 5, lines 28-31).

Thus are claims 19 and 20 rejected.

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cache coherent systems are also disclosed in Baumgartner (US 6546429) and Mounes-Toussi (US 2002/0083271). Examples abound of integrating multiprocessor systems, the following, pertinent to the claimed invention, stand as further evidence to the standard practice in field of use: Gadre (US 2002/0184450), Gelke (US 6574142).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifford H Knoll whose telephone number is 703-305-8656. The examiner can normally be reached on M-F 0630-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark H Rinehart can be reached on 703-305-4815. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-2100.

chk


XUAN M. THAI
PRIMARY EXAMINER
TC2100